

Experimental Climate Monitoring and Prediction

by: Ruchira Lokuhetti, Prabodha Agalawatte, Manusha Lakmali, Zeenas Yahiya,
Lareef Zubair and Michael Bell¹ (FECT and IRI¹)

27 October 2016

Highlights

Wet weather conditions prevailed in many parts of the country during 19th-25th October, with the highest recorded rainfall of 90mm in Kegalle on 24th. Minimum temperature of 15 °C was recorded from Nuwara Eliya district while the maximum temperature between 35-40 °C was recorded from Vavuniya, Mannar and Anuradhapura districts. Up to 30km/h north westerly winds were recorded in the southern half of the country. For the period from 26th October – 1st November the NOAA NCEP model predicts up to 55mm of rainfall for Colombo, Ratnapura, Galle and Matara regions. Up to 15km/h westerly wind is expected in the southern regions of the country.

Monitoring

Rainfall

Weekly Monitoring: Up to 50mm of rainfall was observed on the 19th in Nelliady in Jaffna, and the coastal areas of Kalkuda in Batticaloa. Welikanda, Kandakadu and Trikonamadu areas in Polonnaruwa received up to 30mm rainfall; and up to 20mm rainfall was observed in the western regions of Anuradhapura and northern regions of Monaragala. On 20th up to 20 mm of rainfall was observed in Anuradhapura and Polonnaruwa. On 21st the Maradankadawela region of Anuradhapura, and Kalkuda area received up to 30mm rainfall with adjacent sea area receiving up to 50mm rainfall. Up to 20mm rainfall was observed in several regions of Puttalam and Kurunegala districts including Avissawella and Deniyaya. On 22nd up to 50mm rainfall was observed in coastal regions of Colombo district and Baduluwela region of Monaragala district. Gampaha and western sea region received up to 30mm rainfall. Vavuniya, Trincomalee, Badulla and Kurunegala, Madampe and Ratnapura received up to 20mm rainfall. On 23rd up to 70 mm rainfall was observed in surrounding areas of Ingiriya in Kalutara; Colombo district received up to 50mm rainfall; Gampaha, Galle, Kegalle and Ampara districts received up to 20mm of rainfall and the western and north eastern coastal areas received up to 50mm of rainfall. On 24th up to 90mm of rainfall was observed in Kegalle district and up to 50mm rainfall was observed in Kurunegala, Gampaha, Ratnapura, Nuwara Eliya and Kandy districts; and Puttalam, Kalutara, Galle, Matara and Ampara districts received up to 20 mm rainfall; the area near the eastern sea received up to 60mm rainfall while south western sea received up to 30mm rainfall. For the past week, the RFE 2.0 tool shows rainfall up to 100mm in Kegalla and Ratnapura. Up to 75mm of rainfall is shown in Colombo and Gampaha districts including several areas of Puttalam, Kurunegala, Kalutara, Anuradhapura and Monaragala districts. Rainfall between 10-25 mm is shown for several northern and south eastern regions of the island. It also shows an above average rainfall of 25-50 mm in the Kegalle district. Below average rainfall of 50-100mm is shown for Mannar, Vavuniya, Matale and Monaragala regions, and 25-50 mm for most parts of the island.

Monthly Monitoring: Below average rainfall conditions were experienced in the entire island in the month of September. Monthly average amount to 120mm/month in Ahungalla and Ratnapura town while in all other area rainfall did not exceed 60mm/month. The CPC Unified Precipitation Analysis tool shows ~75mm of total rainfall in Ratnapura, ~25 mm of rainfall in Colombo, Kegalle, Nuwara Eliya, Bandarawela and Matara.

Temperature

From 16th-22nd October the lowest temperature of 10-15°C was recorded in Nuwara Eliya. The maximum temperature recorded was between 35-40°C in Vavuniya, Mannar and Anuradhapura districts. The maximum temperature range in Kandy, Kegalle, Badulla and Balangoda was 20-25°C. The maximum temperature in the rest of the country was between 30-35 °C. During this period an above average temperature of 0-3°C was observed by the entire country except for Nuwara Eliya and Badulla regions where an above average temperature of 0-1 °C was observed.

Wind

At 850 mb level up to 30 km/h north westerly wind was experienced by the southern half of the island including Ampara district. The rest of the country experienced wind in the same direction with speed less than 20 km/h. At 700 mb level Southern province experienced north westerly winds with a speed of up to 30 km/h while rest of the country experienced winds with a speed less than 20km/h in the same direction.

Ocean State

Pacific sea state: October 20, 2016

During mid-October 2016 the tropical Pacific SST anomaly was slightly cooler than -0.5C, the threshold for weak La Niña. However, not all of the atmospheric variables have been supporting weak La Niña conditions for a sufficient duration to constitute good ocean-atmospheric coupling. Although the upper level winds suggest weak La Niña, the lower level trade winds only became stronger than average in mid-September. The Southern Oscillation index and the pattern of cloudiness and rainfall do indicate weak La Niña

conditions. The lack of enhanced trade winds until recently makes us hesitate to say La Niña has really begun, so our diagnosis remains ENSO-neutral. The collection of ENSO prediction models indicates SSTs near or slightly cooler than the threshold of La Niña during fall, then weakening to cool-neutral during winter. (Text Courtesy IRI)

Indian Ocean State

0.5 °C above average sea surface temperature was observed in the northern and eastern sea of Sri Lanka.

Predictions

Rainfall

14-day prediction: From 26th October to 1st November, the NOAA NCEP models predicts total rainfall, between 45-55mm in Colombo, Ratnapura, Galle and Matara; 35-45mm in Gampaha, Kegalle, Balangoda, and Hambantota; 25-35mm in Jaffna, Vavuniya, Mannar, Nuwara Eliya and Bandarawela; and total rainfall between 5-15mm is expected in most parts of the country. Increased total rainfall between 75-85mm is expected around the coastal areas of Colombo and adjacent sea during 2nd-8th November.

Weekly prediction: IMD GFS model predicts rainfall between 10-20mm for the whole island except for Northern, Eastern and Western provinces for the 27th of October. On 28th Rainfall between 10-20mm is expected for central and south eastern regions of the country including several regions of Puttalam and Polonnaruwa districts. On 29th north, north eastern and south eastern regions of the island are expected to receive rainfall between 10-20mm with south eastern sea receiving 20-40 mm rainfall. On 30th the whole island is expected to receive rainfall between 10-20mm except for Kurunegala and western coastal regions of the country. On 31st Nuwara Eliya, Kandy, Anuradhapura and southern sea adjacent to the island are expected to receive rainfall between 20-40mm. The rest of the country except for coastal regions of Western province is expected to receive rainfall between 10-20mm. On 1st surrounding areas of Ratnapura and southern coastal area of the island are expected to receive rainfall between 20-40mm while rest of the country is expected to receive rainfall between 10-20mm.

IMD WRF & IRI Model Forecast: According to the IMD WRF model up to 35mm of rainfall is expected in Balangoda and Ampara regions on the 28th. Eastern, south eastern coastal and central regions of the country are expected to receive up to 7mm rainfall. On 29th western and eastern coastal regions shall receive rainfall up to 7mm, and rainfall shall decrease in the rest of the country.

Seasonal Prediction: As per IRI Multi Model Probability Forecast for October to December, the total 3-month precipitation shall be climatological in the northern half of the island. However the southern half of the island has 30-40% likelihood of being in the below-normal tercile. The 3-month temperature has more than 70-80% likelihood in the entire country of being in the above-normal tercile during this period.

Temperature

NOAA CPC GFS model predicts 35-40°C maximum temperature in eastern coastal belt including Monaragala, Hambantota and Polonnaruwa. The maximum temperature of Ratnapura and Badulla areas will be between 25-30°C while for the rest of the country the maximum temperature will range between 30-35°C. For the same period minimum temperature is expected in Nuwara Eliya to be between 15-20°C.

Wind

The 850 mb level predicts up to 15 km/h westerly wind in the southern region of the island. Up to 10km/h wind in the same direction is expected for the rest of the country. The 700 mb level predicts up to 10km/h north westerly wind for the whole country.

MJO based OLR predictions

MJO shall not have a significant impact on the rainfall in Sri Lanka.

¹ International Research Institute for Climate and Society, Earth Institute at Columbia University, New York.
Official hydro-meteorological statements are provided by the Sri Lanka Department of Meteorology and Department of Irrigation.

FECT BLOG

Past reports available at <http://fectsl.blogspot.com/> and <http://fectsl.wordpress.com/>

FECT WEBSITES

<http://www.climate.lk> and <http://www.tropicalclimate.org/>



www.fb.com/fectsl



[@fectlk](https://twitter.com/fectlk)

Weekly Hydro- Meteorological Report for Sri Lanka

Inside This Issue

1. Monitoring

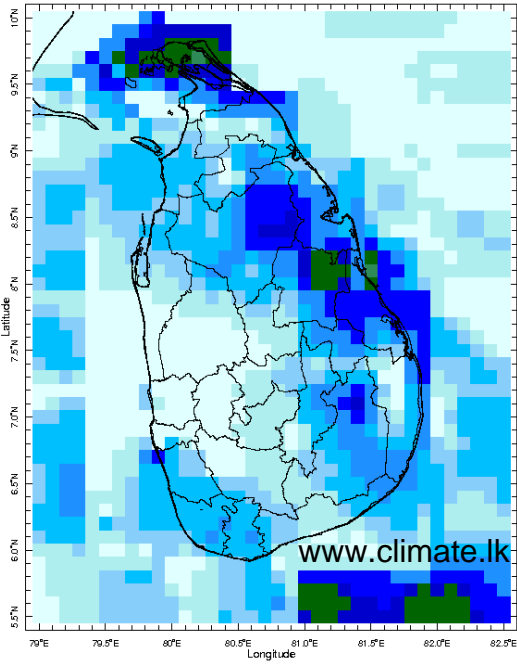
- a. Daily Rainfall Monitoring
- b. Weekly Rainfall Monitoring
- c. Monthly Rainfall Monitoring
- d. Dekadal (10 Day) Satellite Derived Rainfall Estimates
- e. Weekly Temperature Monitoring
- f. Weekly Wind Monitoring
- g. Weekly Average SST Anomalies

2. Predictions

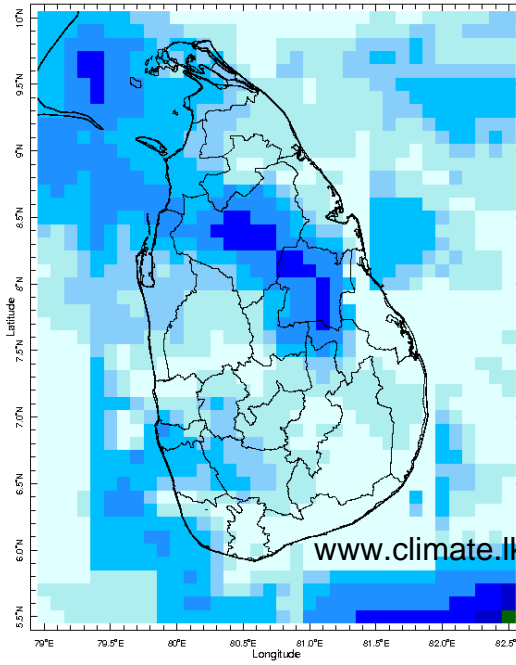
- a. NCEP GFS Ensemble 1-14 day Rainfall Predictions
- b. GFS (T574) Model Rainfall Forecast from RMSC New Delhi
- c. WRF Model Rainfall Forecast from IMD Chennai
- d. MJO Related OLR Forecast
- e. Weekly Precipitation Forecast from IRI
- f. Weekly Temperature Forecast
- g. Weekly Wind Forecast
- h. Seasonal Predictions from IRI

DailyRainfall Monitoring

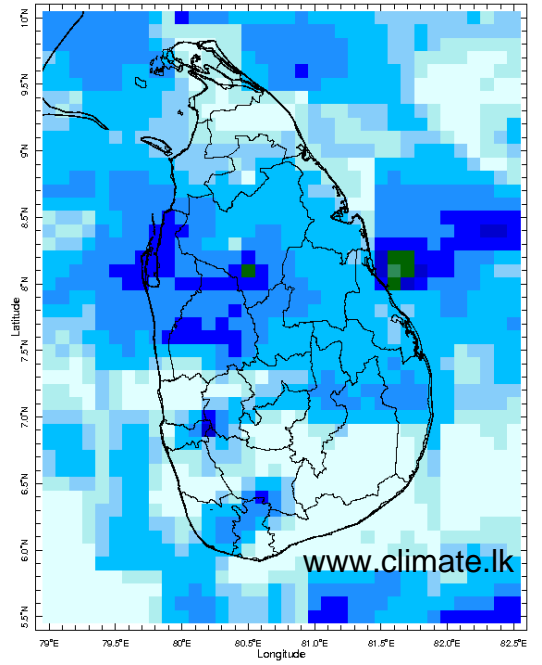
The following figures show the satellite observedrainfall in the last 7 days in Sri Lanka.



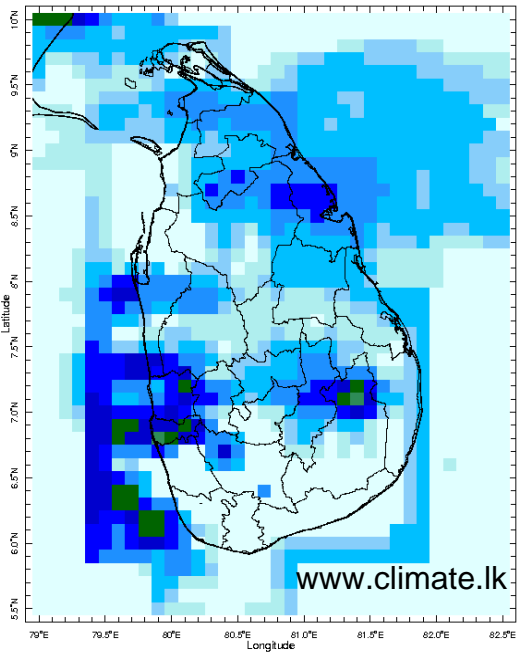
19 Oct 2016



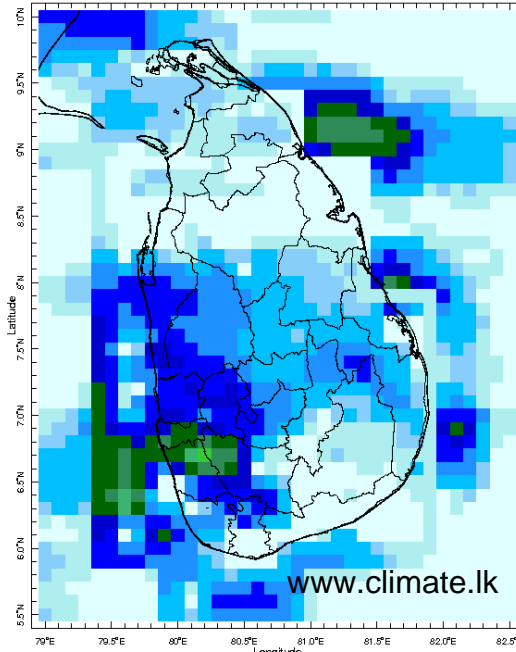
20 Oct 2016



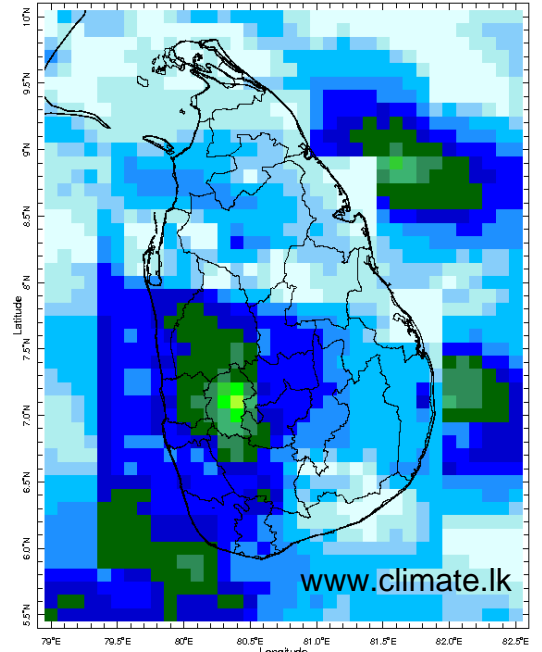
21 Oct 2016



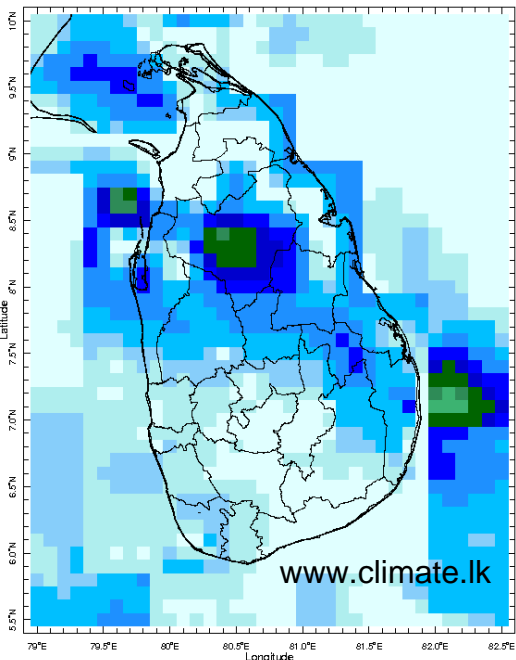
22 Oct 2016



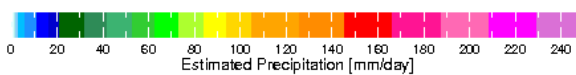
23 Oct 2016



24 Oct 2016

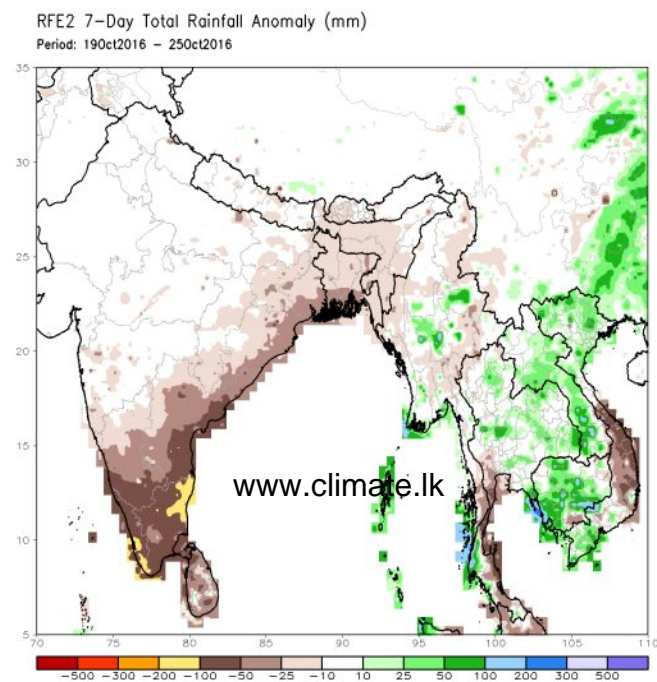
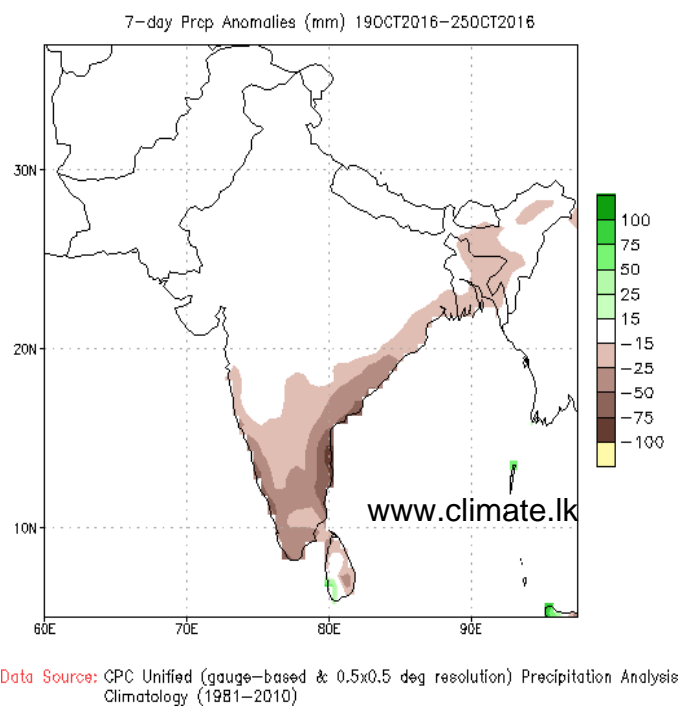
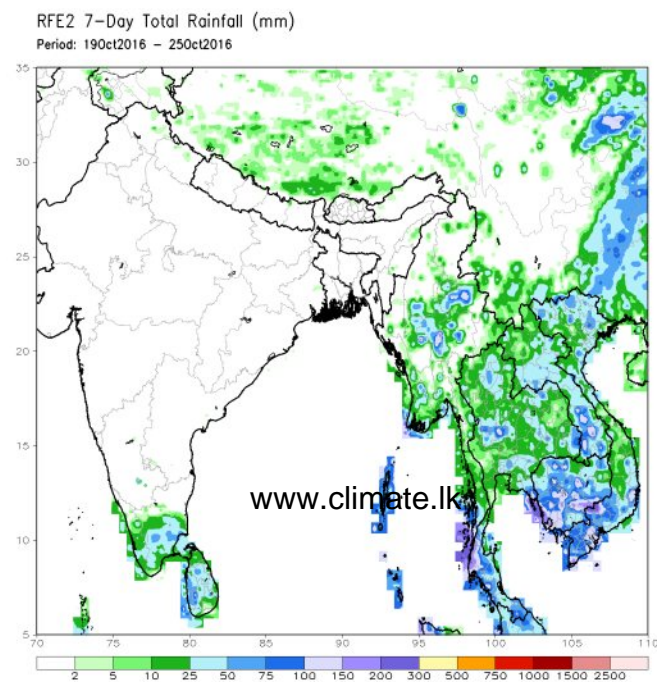
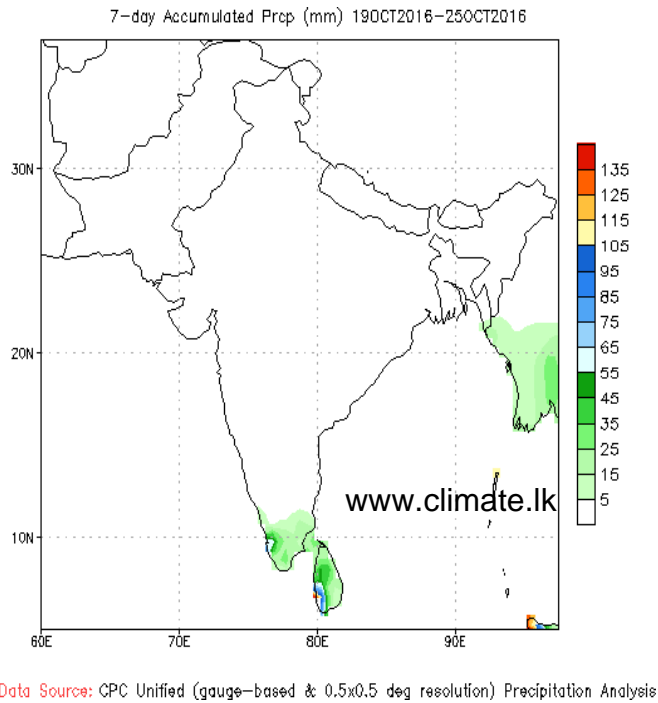


25 Oct 2016



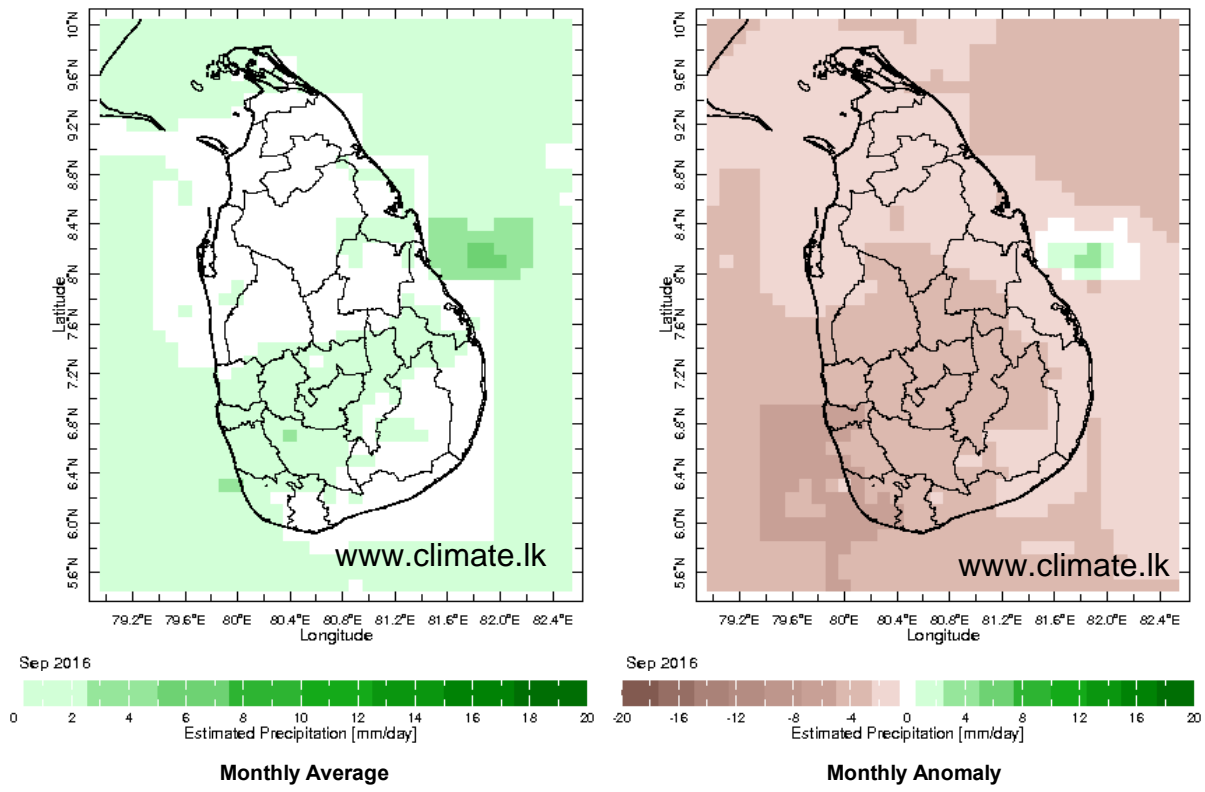
Weekly Rainfall Monitoring

The following figures show the total satellite observed rainfall in the last week in Sri Lanka. The figure in the left is the total 7-day rainfall from NOAA Climate Prediction Center (CPC) Unified Precipitation Analysis and the figure in the right is the total 7-day rainfall from CPC RFE 2.0 Satellite Rainfall Estimates. The bottom two figures are the respective anomalies.

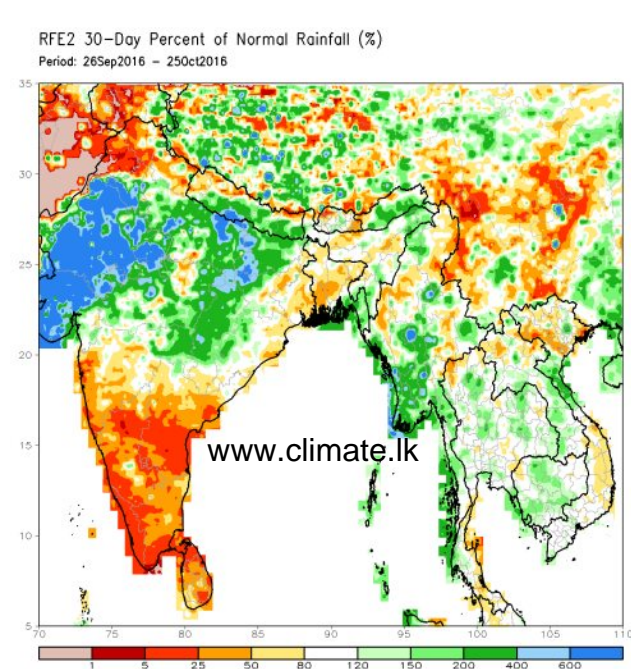
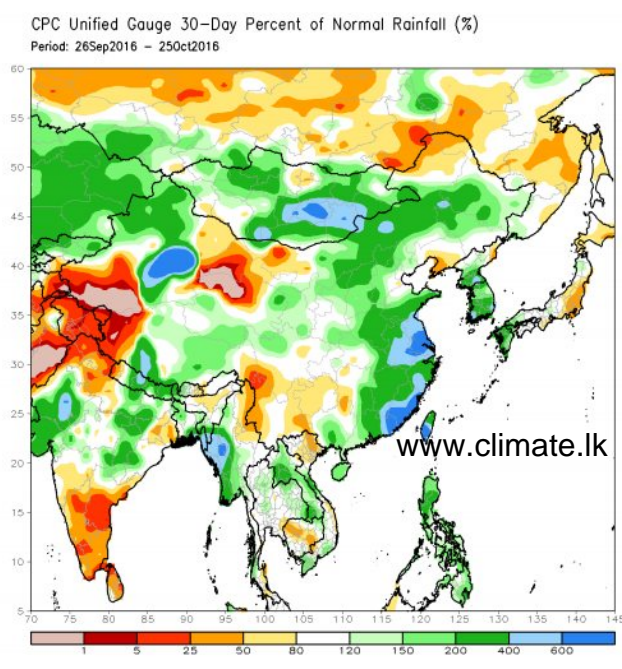
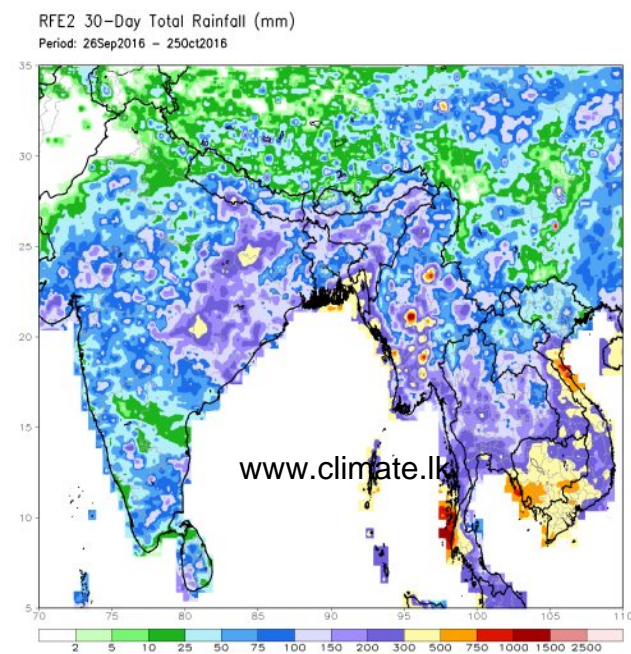
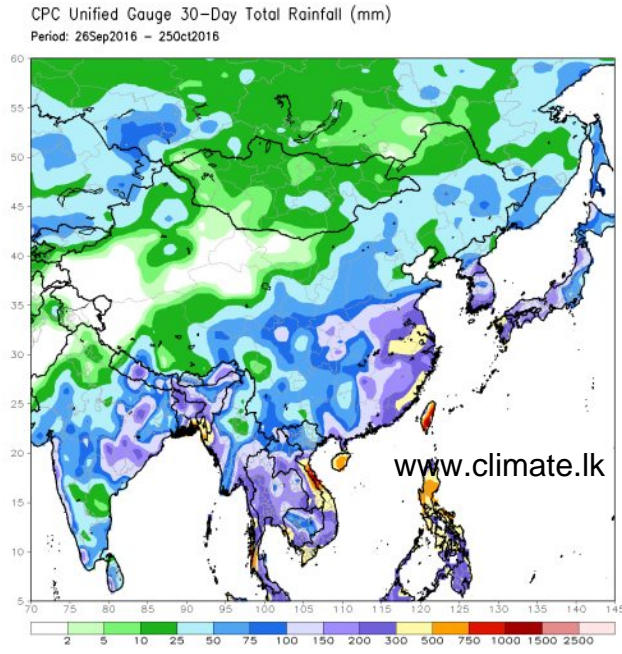


Monthly Rainfall Monitoring

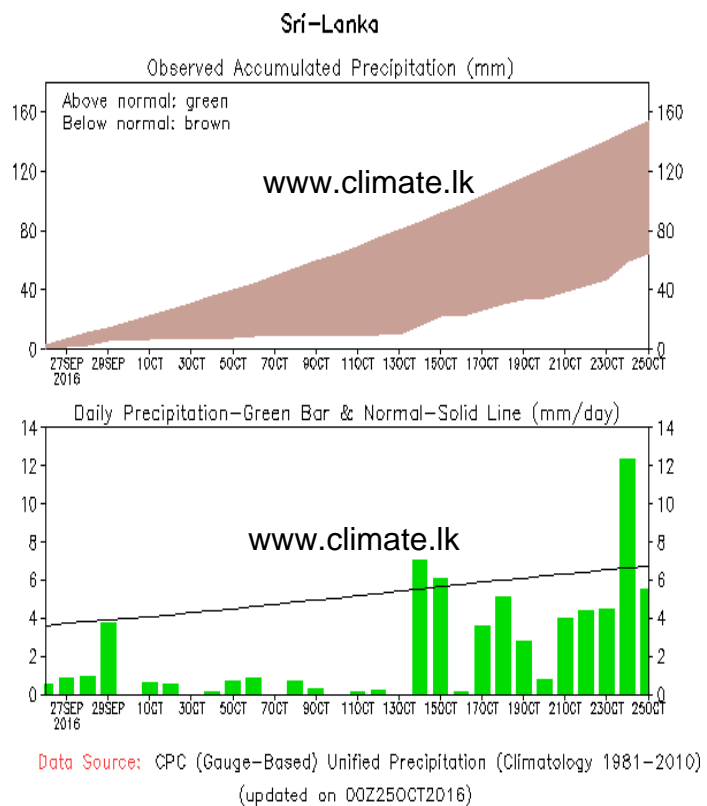
The figure in the left shows the average observed rainfall in the previous month. The rainfall anomaly in the previous month is shown in the figure to the right. The brown color in the anomaly figure shows places which received less rainfall than the historical average while the green color shows places with above average rainfall. Darker shades show higher magnitudes in rainfall



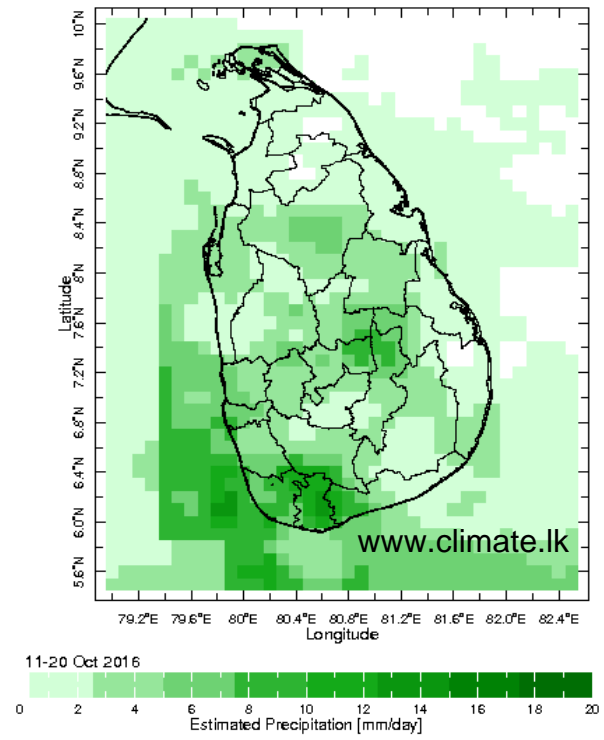
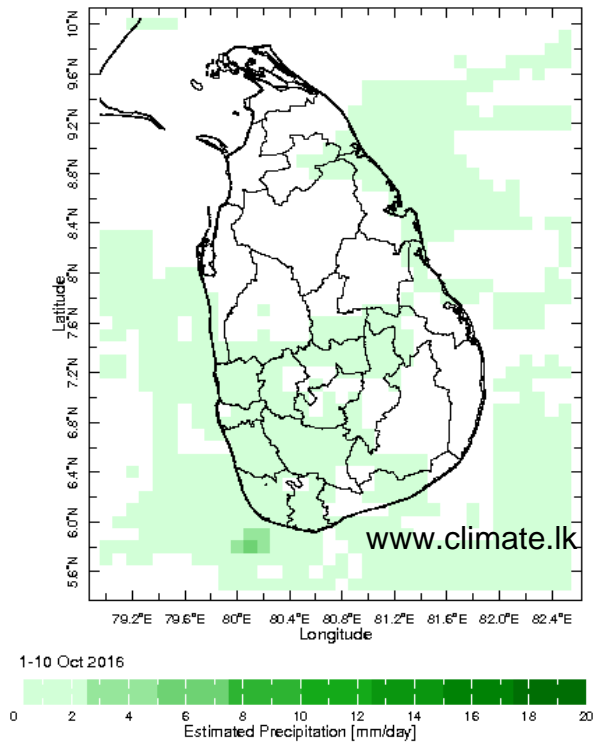
The figure in the top-left shows the total rainfall in the past 30 days from CPC Unified Precipitation Analysis while the figure in the top-right shows the total rainfall for the same period from RFE 2.0 Satellite Rainfall Estimates. The bottom two figures show the percentage of rainfall received in the past 30 days compared to normal rainfall in this period.



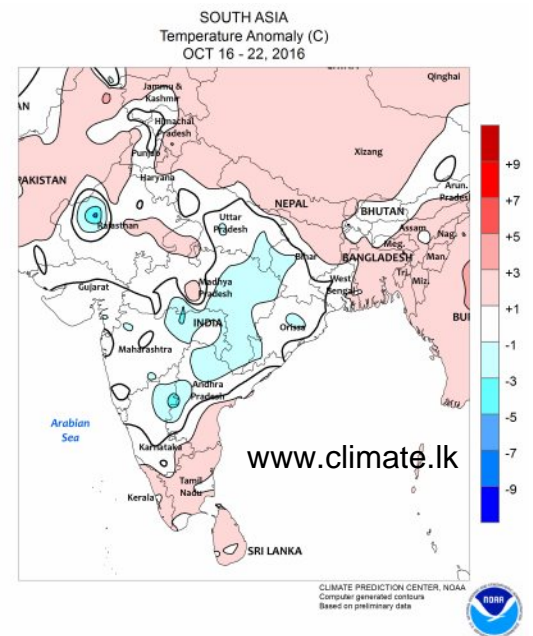
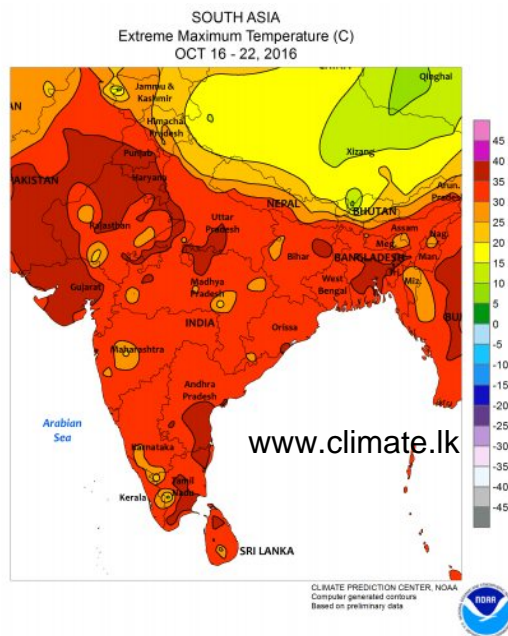
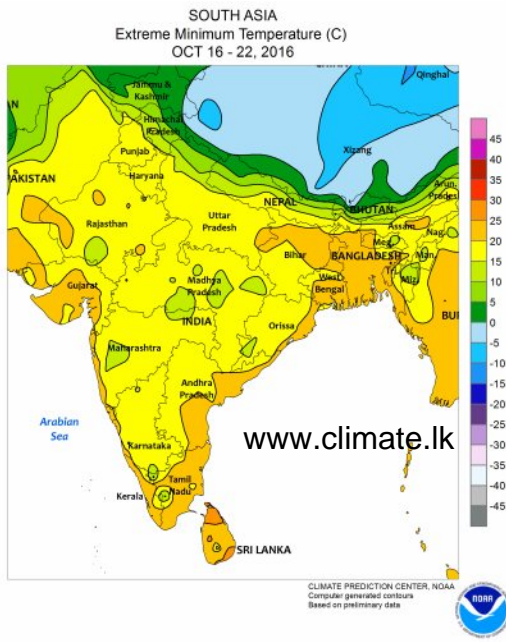
The following figure shows the observed accumulated rainfall (top) and daily observed rainfall (bottom) in Sri Lanka in the last 30 days.



Dekadal (10 Day) Satellite Derived Rainfall Estimates

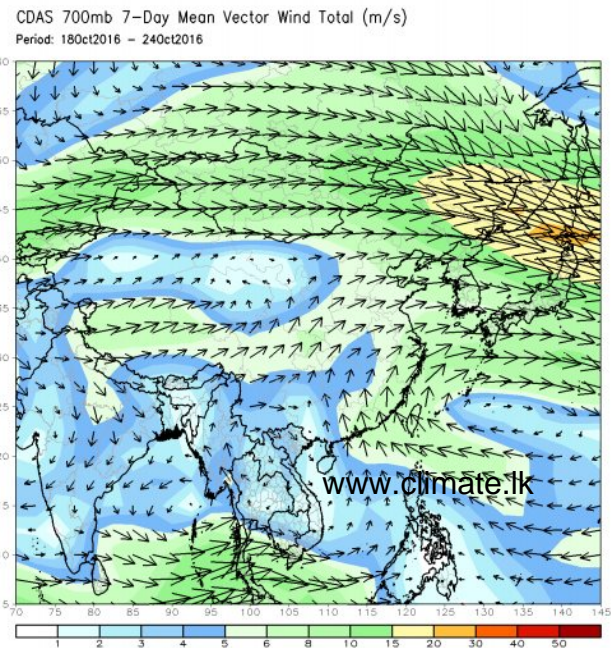
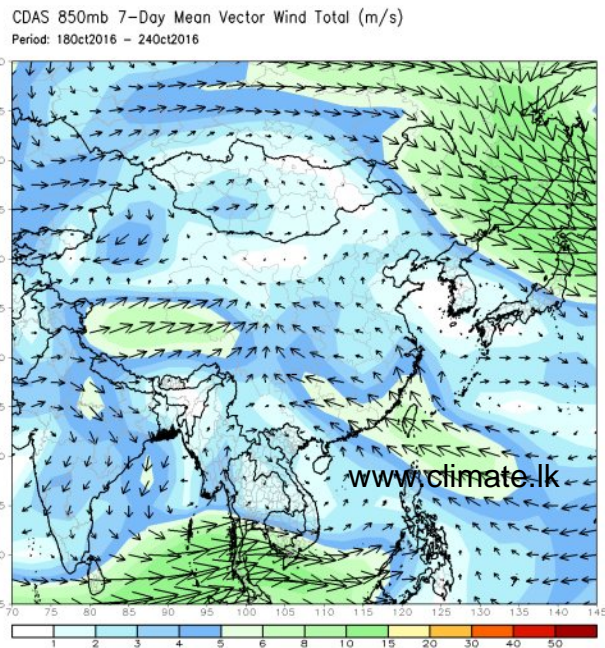


Weekly Temperature Monitoring



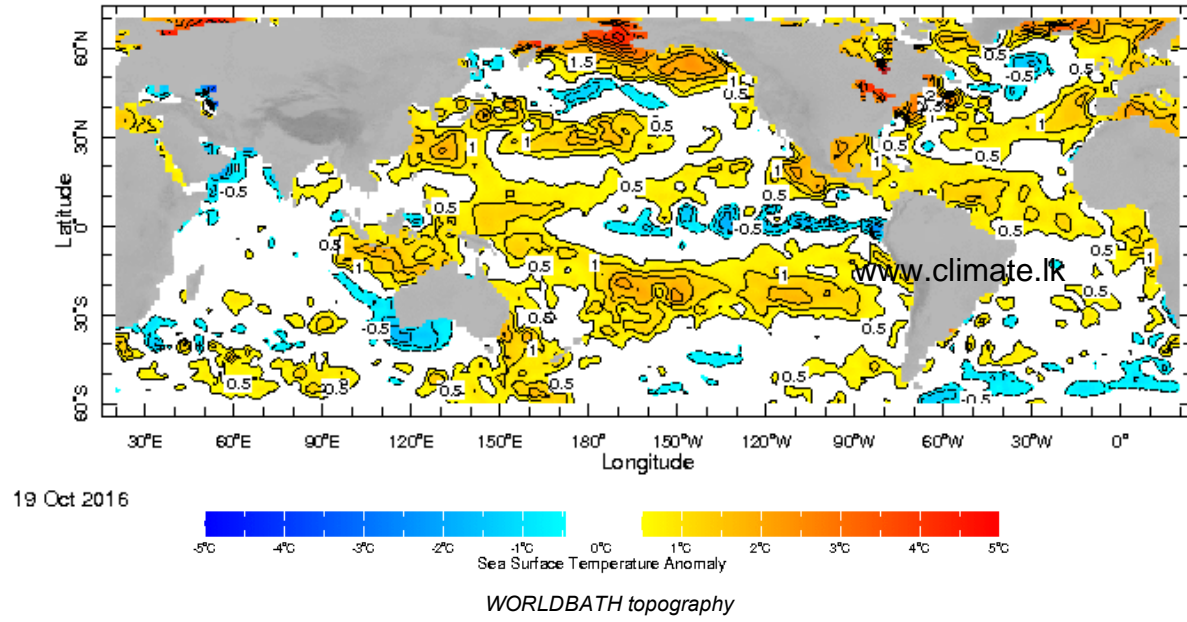
Weekly Wind Monitoring

The following figures show the mean vector wind total of the past 7 days near Sri Lanka at two levels. The figure on the left shows 850 mb (~1500 m) level and the figure on the right shows 700 mb (~3000 m) level.

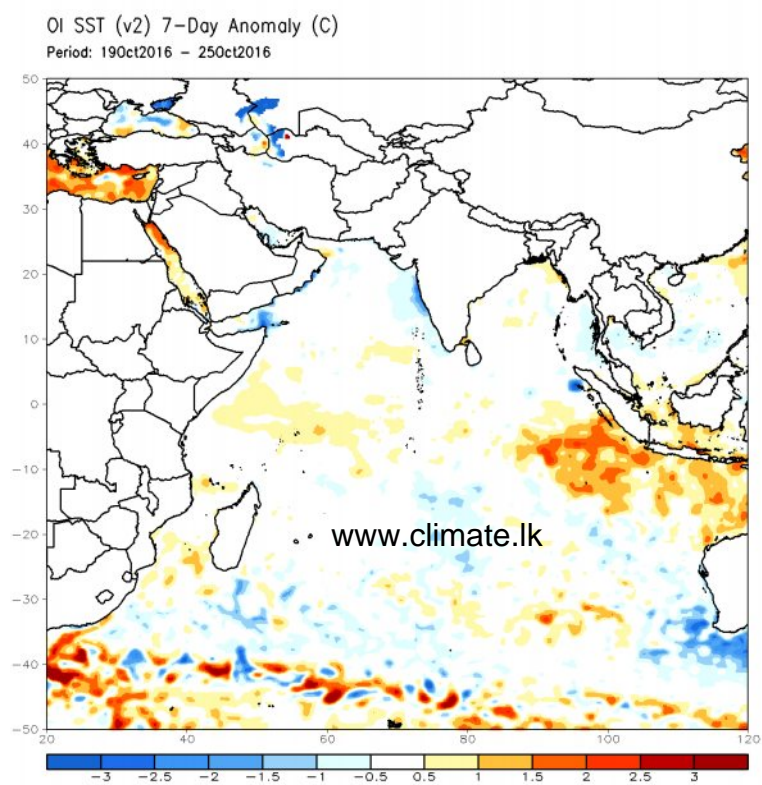


Weekly Average SST Anomalies

Weekly average Sea Surface Temperature (SST) anomaly in the world from NOAA NCEP

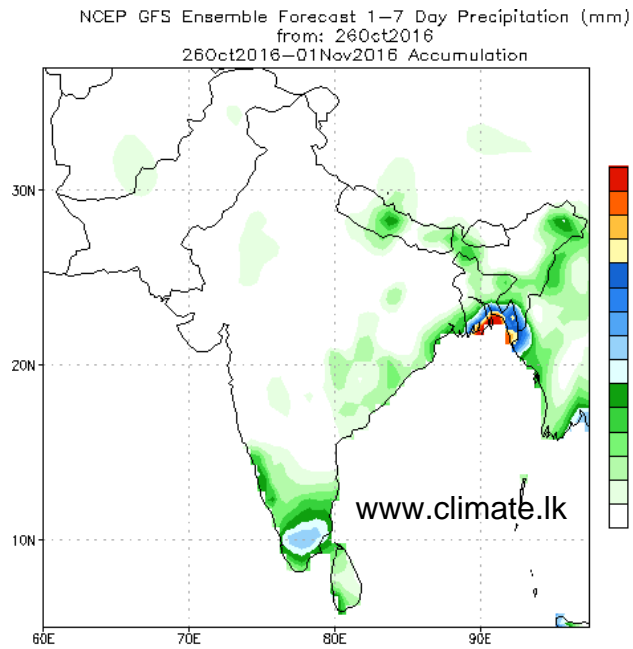


Optimum Interpolated Sea Surface Temperature Anomaly in the Indian Ocean from NOAA CPC

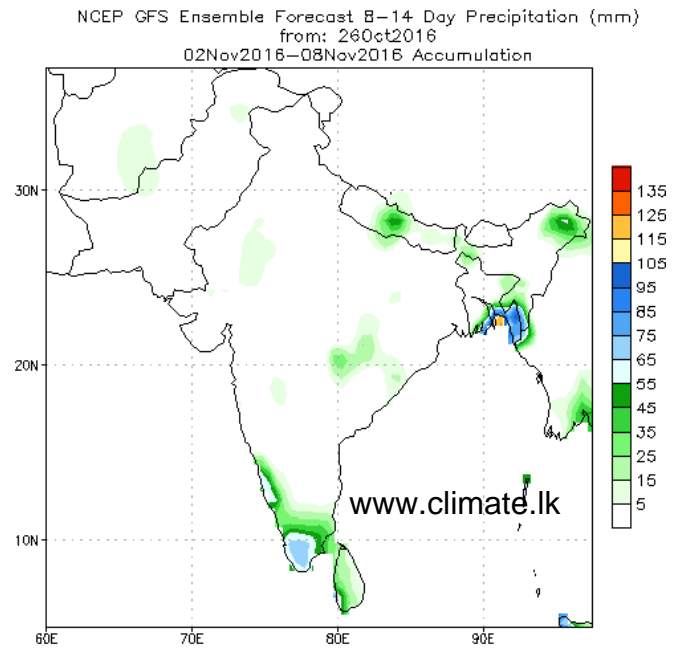


PREDICTIONS

NCEP GFS 1- 14 Day prediction

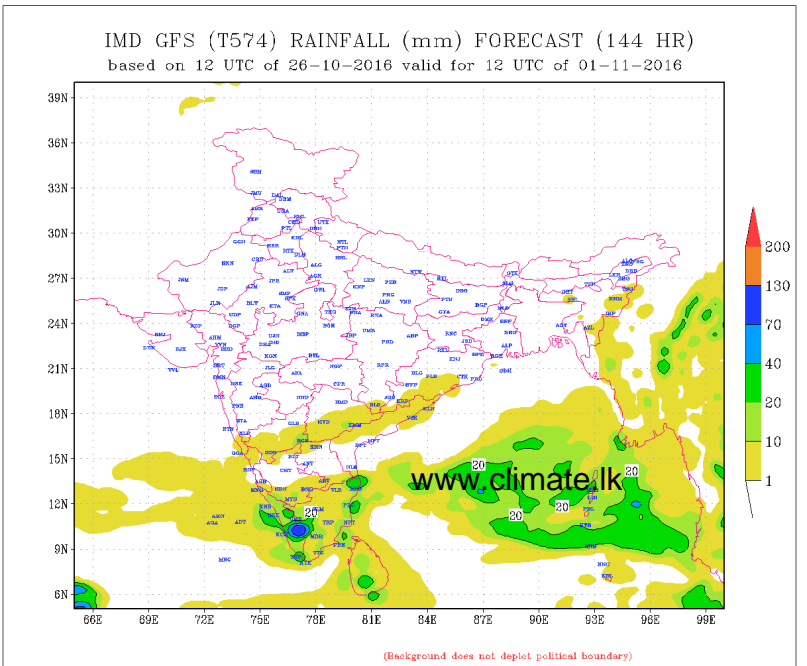
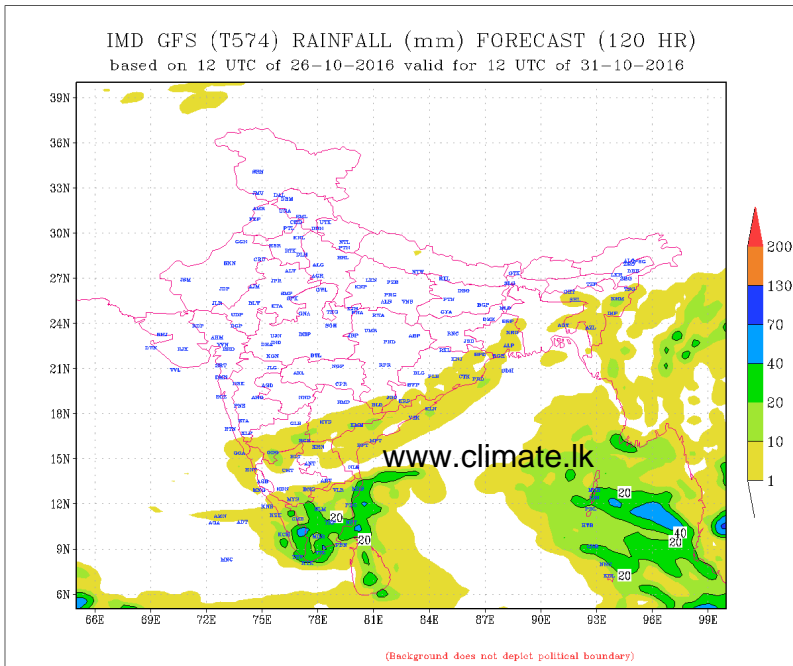
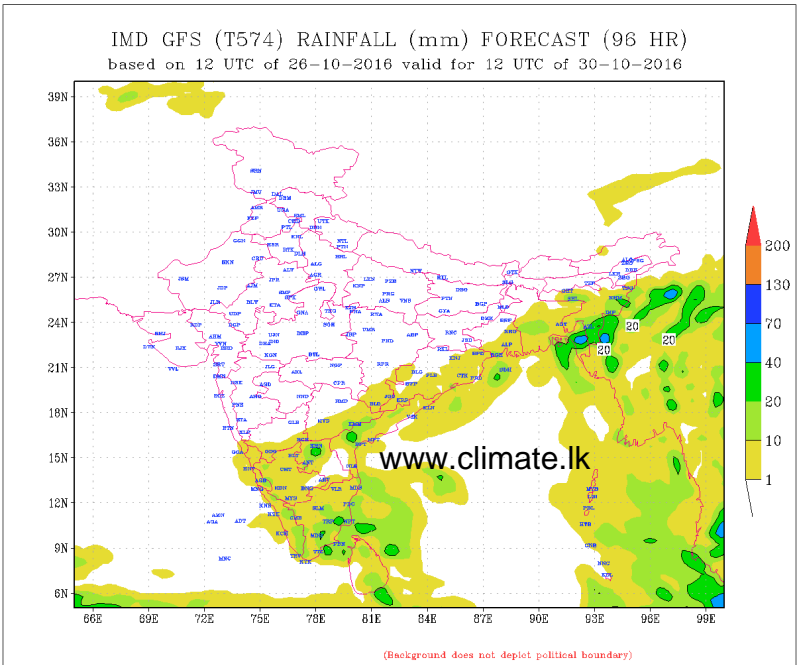
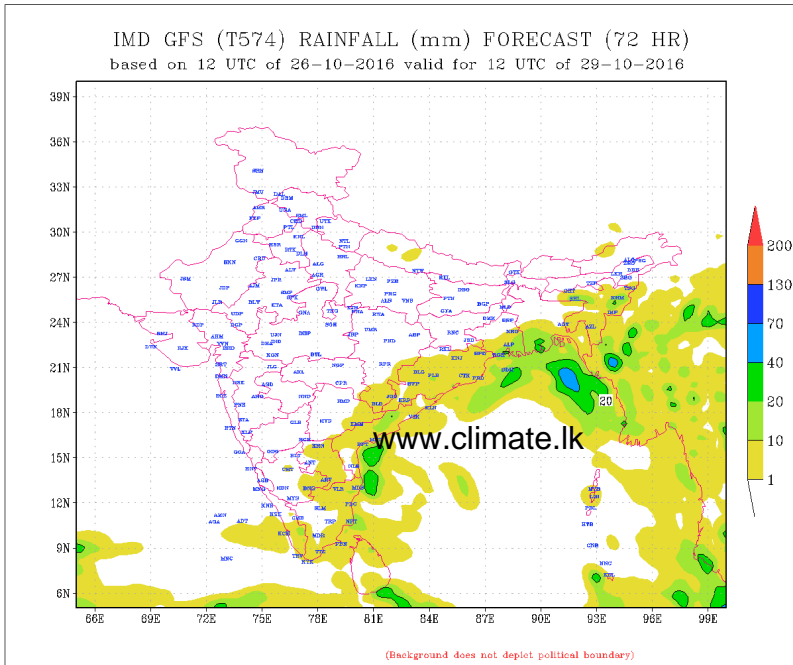
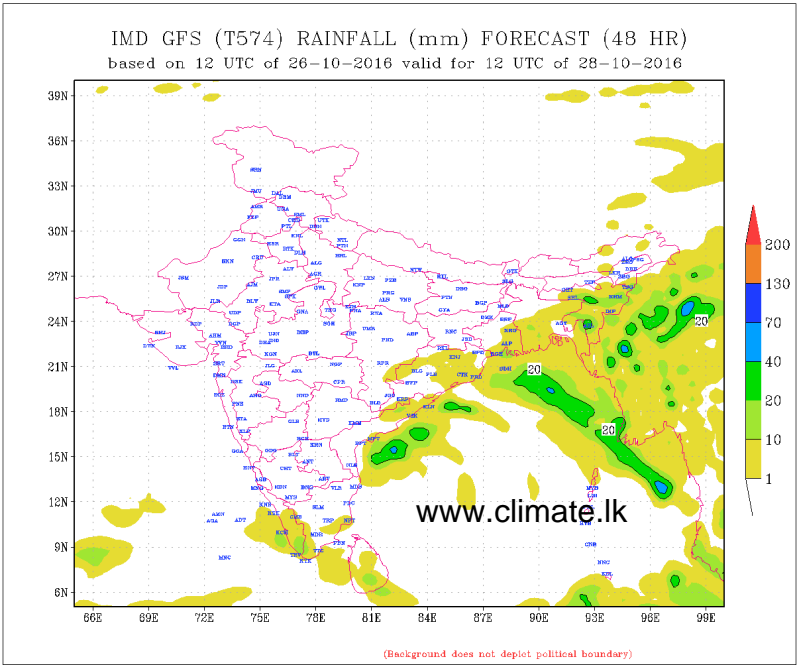
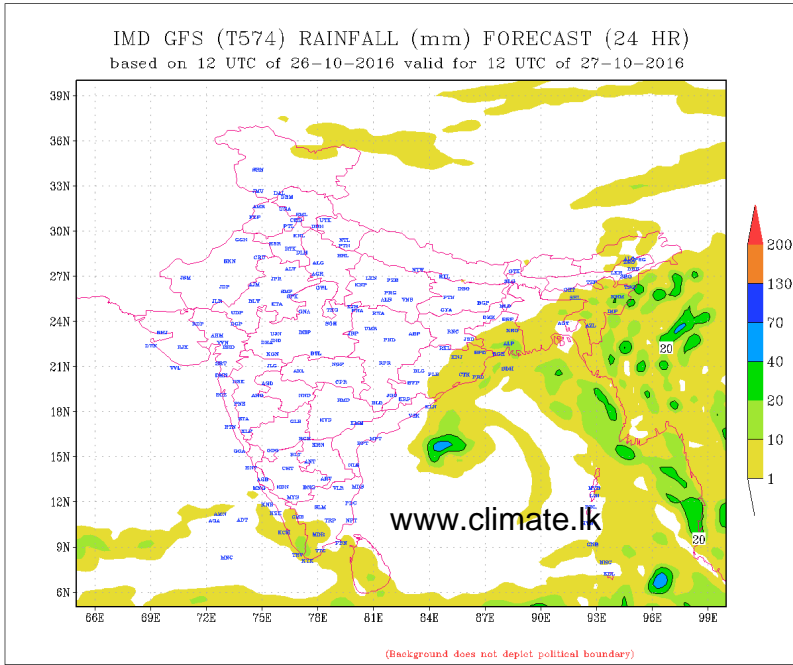


Bias correction based on last 30-day forecast error

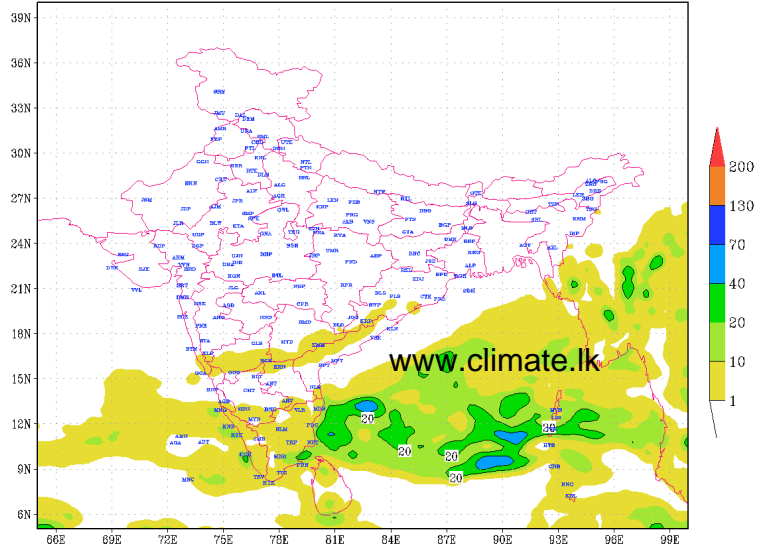


Bias correction based on last 30-day forecast error

IMD GFS (T574) Model Rainfall Forecast from RMSC New Delhi, India



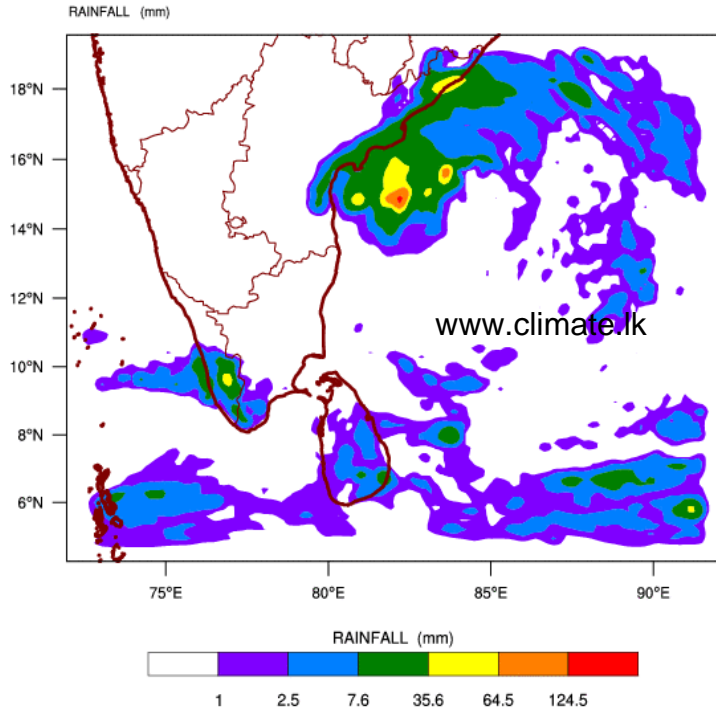
IMD GFS (T574) RAINFALL (mm) FORECAST (168 HR)
based on 12 UTC of 26-10-2016 valid for 12 UTC of 02-11-2016



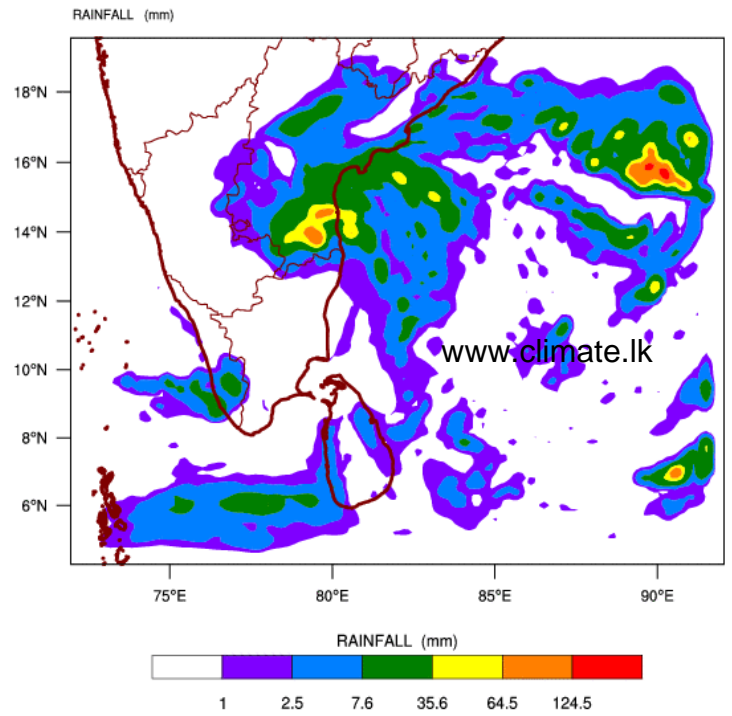
(Background does not depict political boundary)

WRF Model Forecast (from IMD Chennai)

WRF MODEL FORECAST (48 HR.) RAINFALL(mm)\
based on 00 UTC of 26-10-2016 valid for 03 UTC of 28-10-2016

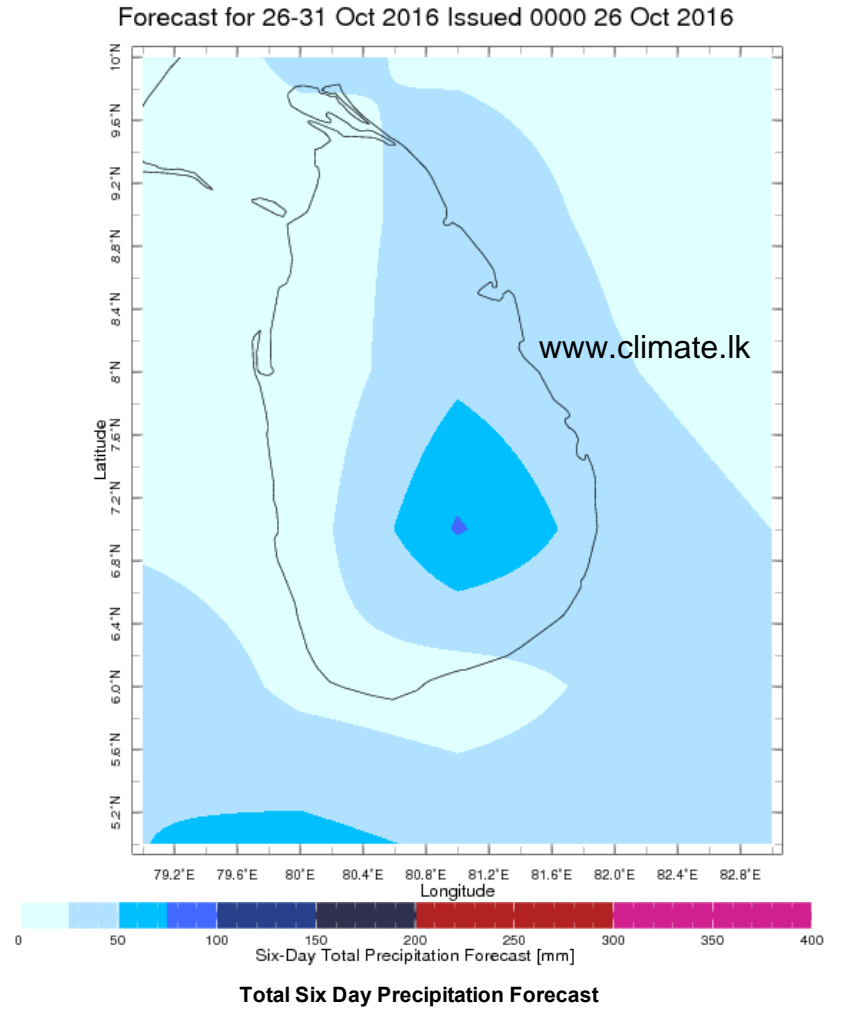
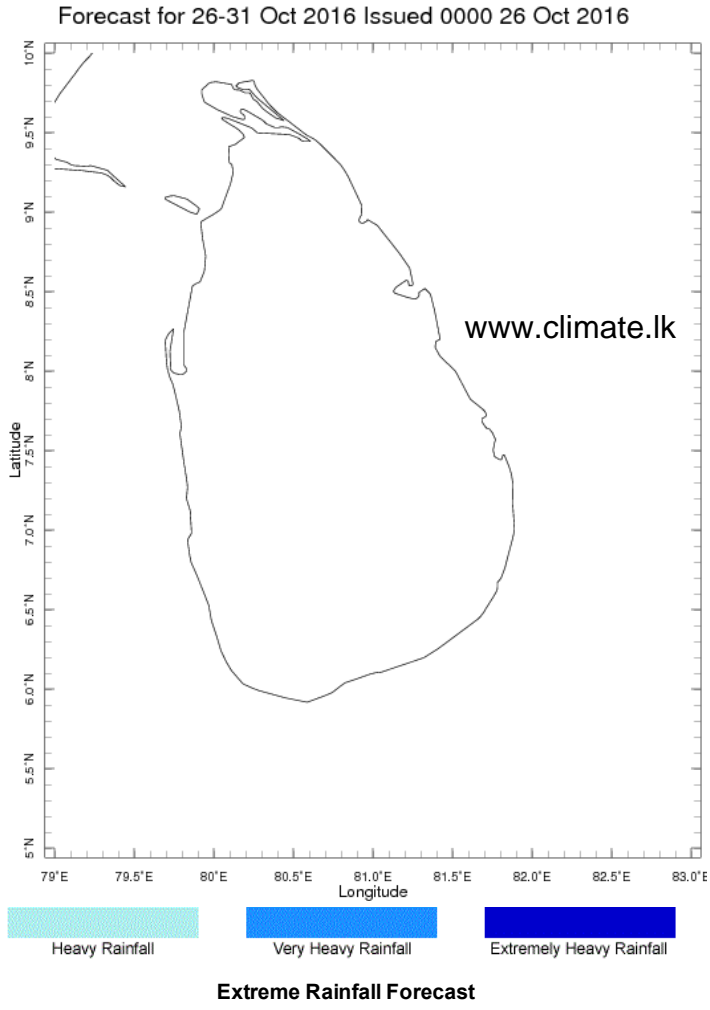


WRF MODEL FORECAST (72 HR.) RAINFALL(mm)\
based on 00 UTC of 26-10-2016 valid for 03 UTC of 29-10-2016



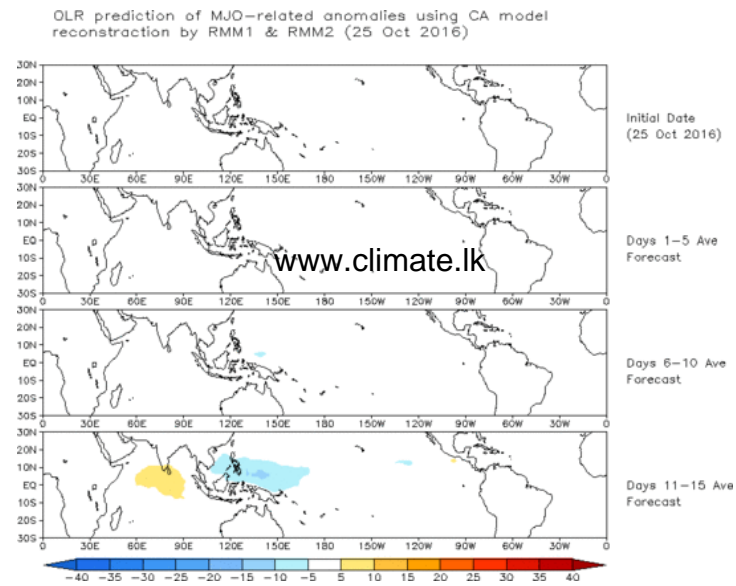
Weekly Rainfall Forecast from IRI

Total rainfall forecast from the IRI for next six days is provided in figures below. The figure to the left shows the expectancy of heavy rainfall events during these six days while the figure to the right is the prediction of total rainfall amount during this period.



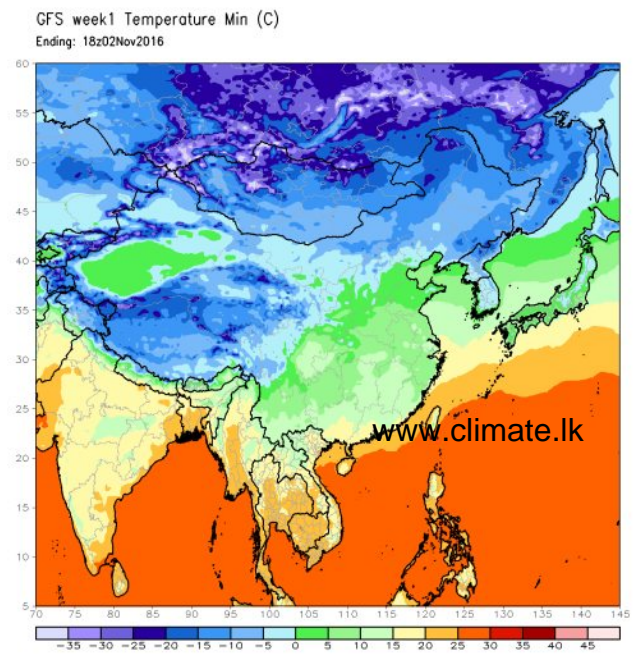
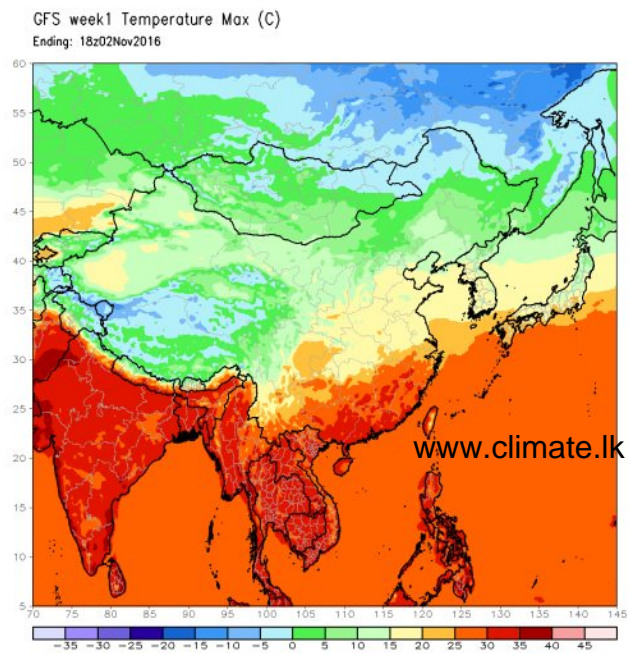
Madden Julian Oscillation (MJO) related Outgoing Longwave Radiation (OLR) Forecast

The Outgoing Longwave Radiation (OLR) is a proxy for rainfall. This can be used to identify convective rain clouds based on the MJO phase. Violet and Blue shading indicates enhanced tropical weather and Orange shading indicates suppressed conditions. The following figure shows the forecasts of MJO associated anomalous OLR for the next 15 days from the Constructed Analogue (CA) model forecasts.



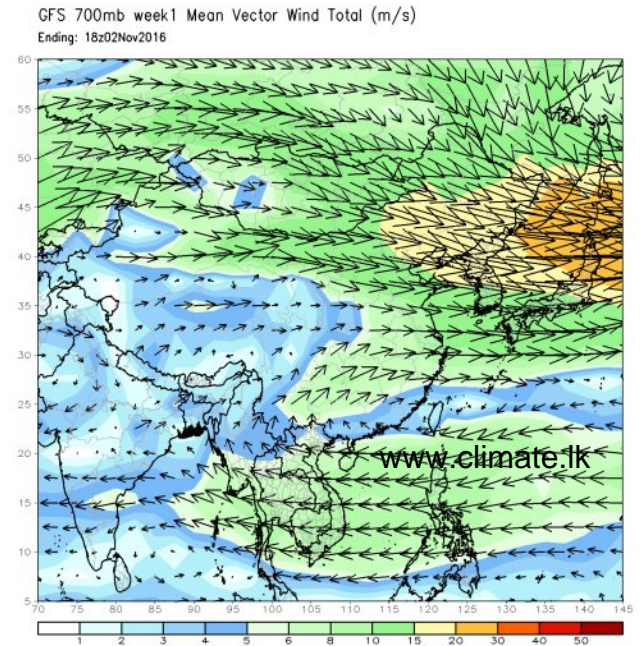
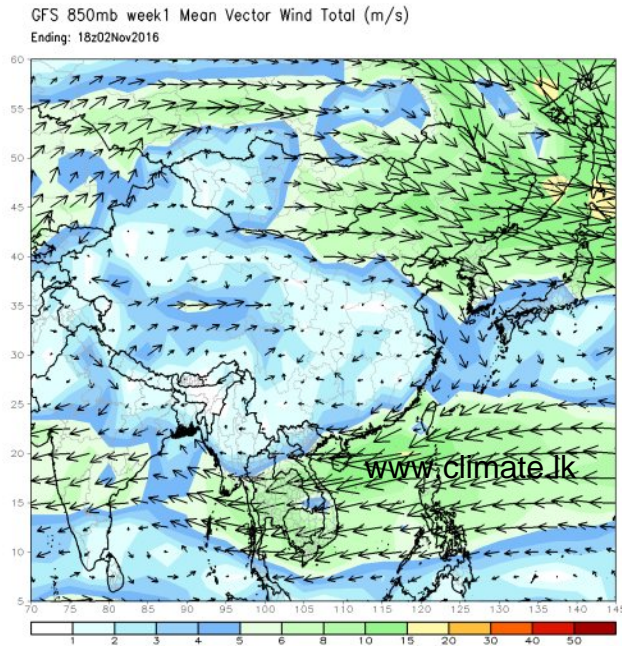
Weekly Temperature Forecast

Weekly Minimum and Maximum Temperature prediction from the GFS model (from NOAA CPC)



Weekly Wind Forecast

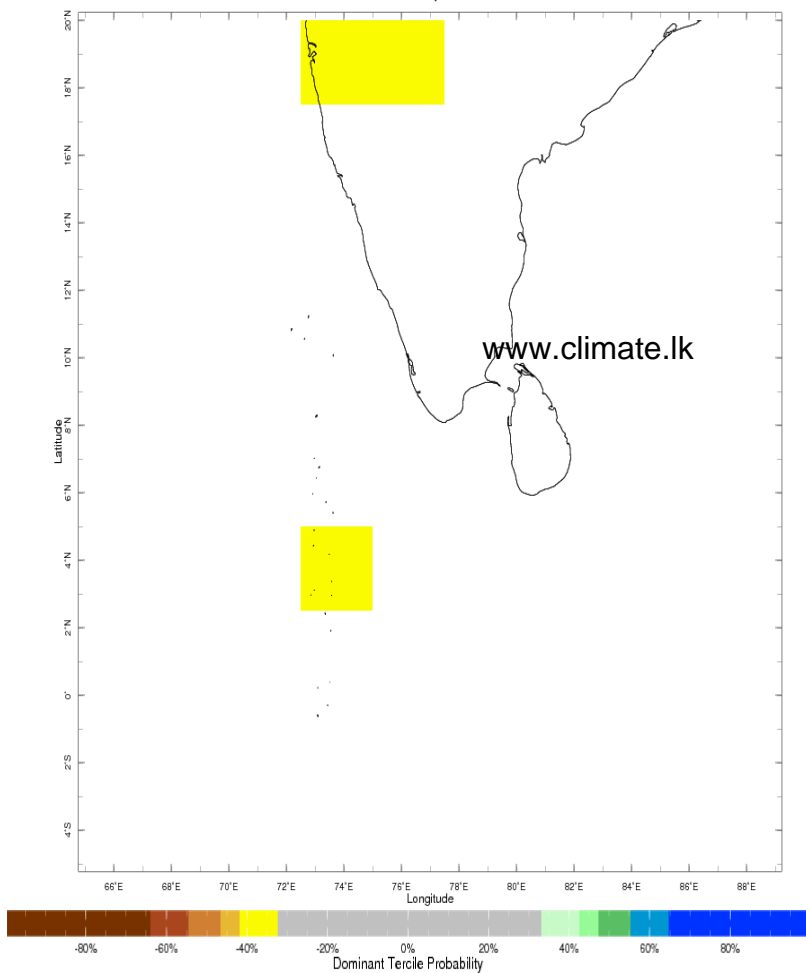
Weekly mean vector wind total prediction from the GFS model at 850 mb (left) and 700 mb (right) levels. (from NOAA CPC)



Seasonal Rainfall and Temperature Forecast

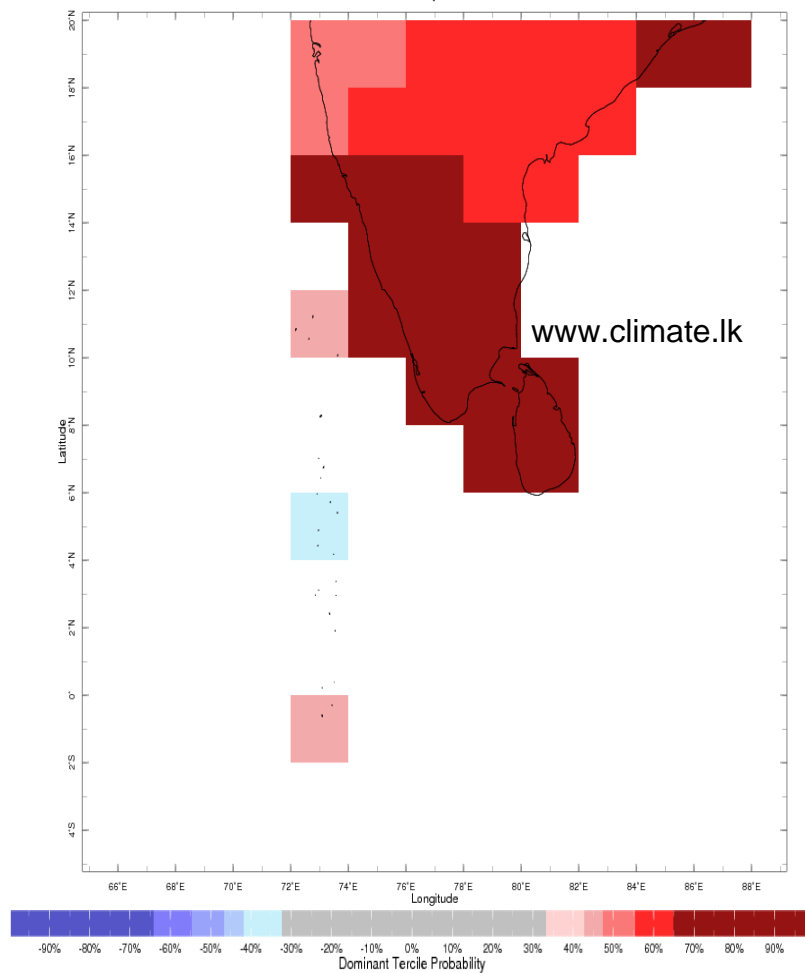
Following is the latest seasonal precipitation and temperature prediction for the next 3 months by the IRI. The color shading indicates the probability of the most dominant tercile -- that is, the tercile having the highest forecast probability. The color bar alongside the map defines these dominant tercile probability levels. The upper side of the color bar shows the colors used for increasingly strong probabilities when the dominant tercile is the above-normal tercile, while the lower side shows likewise for the below-normal tercile. The gray color indicates an enhanced probability for the near-normal tercile (nearly always limited to 40%).

Nov 2016 - Jan 2017 IRI Seasonal Precipitation Forecast issued Oct 2016



Precipitation Forecast

Nov 2016 - Jan 2017 IRI Seasonal Temperature Forecast issued Oct 2016



Temperature Forecast

Subscribe to our Monthly Maldives Newsletter

email address

Subscribe

Follow @fectmv
 Contact Us
 email: fectsl@gmail.com
 phone: (+94) 81 2376746
 blog: www.fectsl.blogspot.com

Foundation for Environment, Climate & Technology
 C/O Mahaweli Authority of Sri Lanka,
 Digana Village,
 Rajawella,
 SRI LANKA